



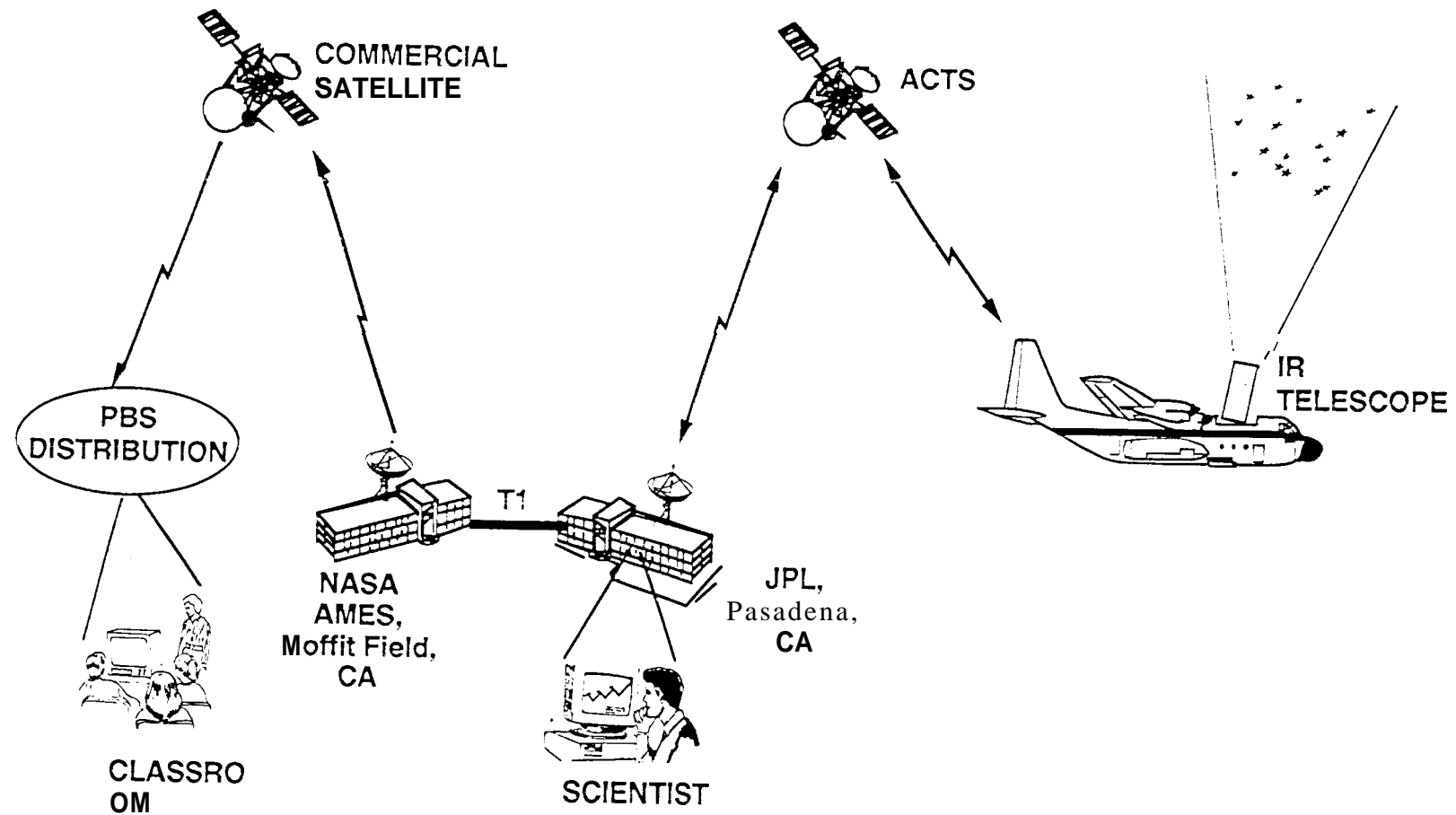
**Quick Look Analysis of Broadband Aeronautical Data
obtained from the Kuiper Airborne Observatory**

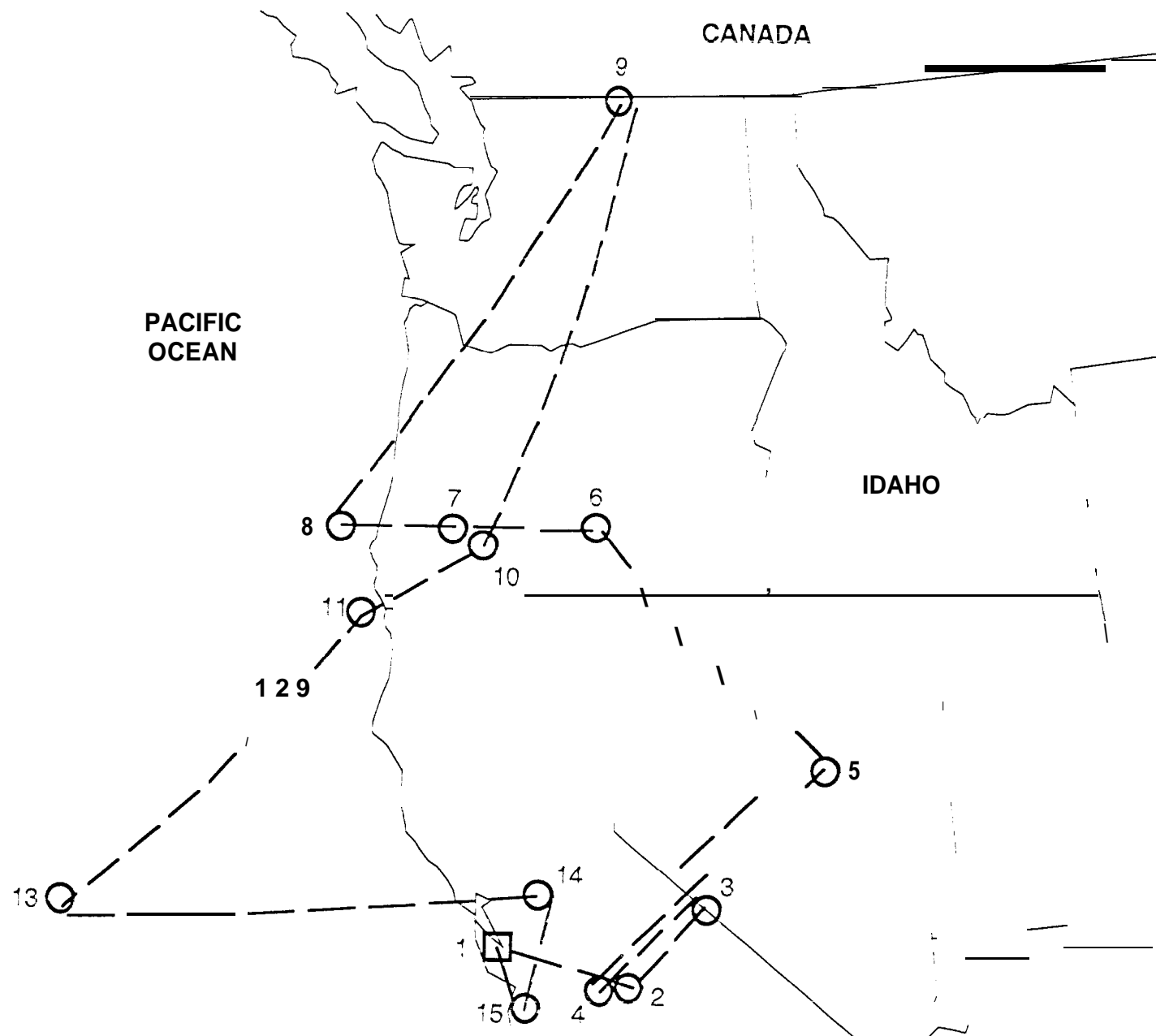
by

Edgar Satorius, Brian Abbe, Martin Agan
Jet Propulsion Laboratory, California Institute of Technology,
Pasadena, Ca

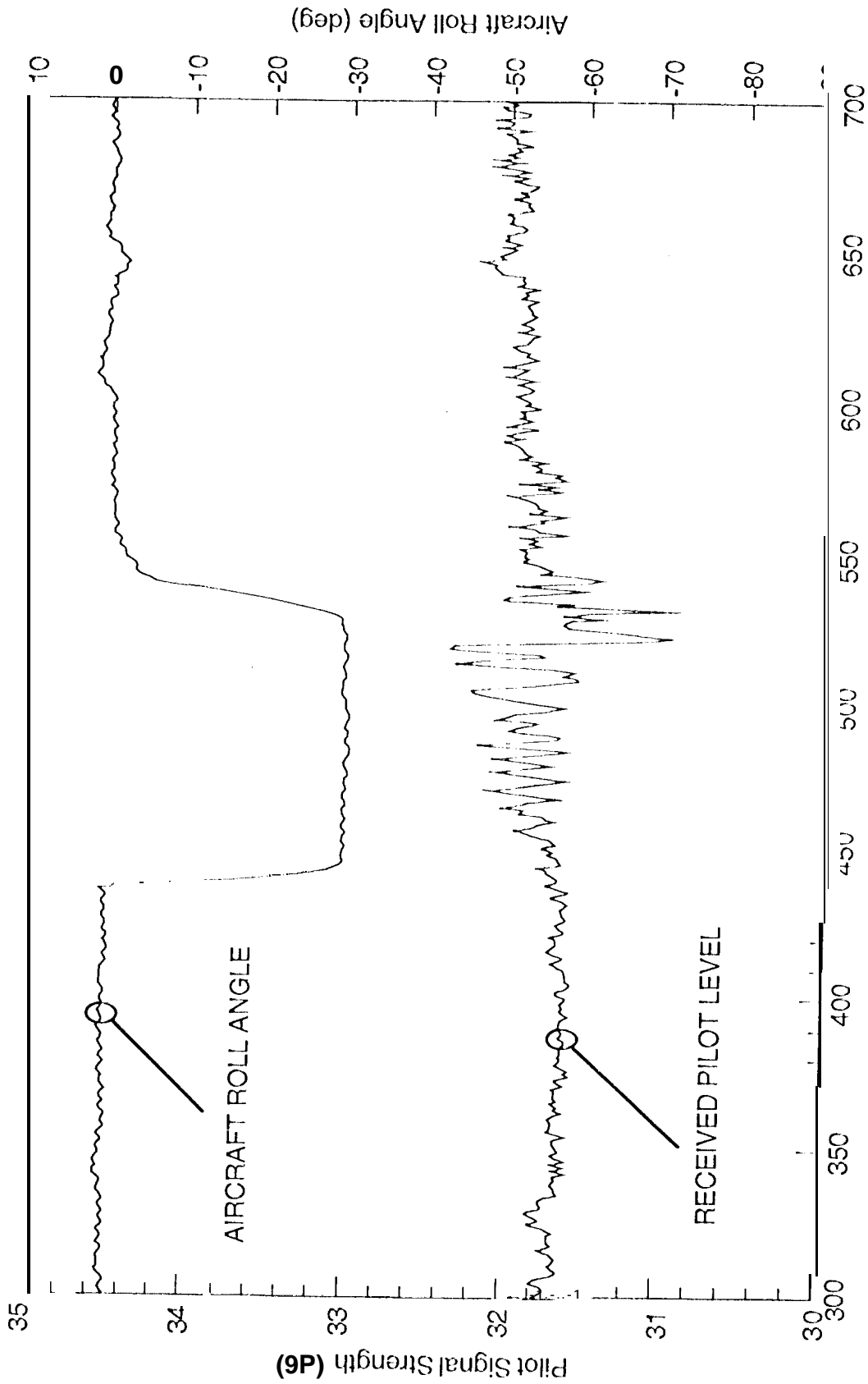
Presented at 20th NASA Propagation Experimenters Meeting (NAPEX XX)
Fairbanks, Alaska, 4-5 June 1996

KAO Experiment Configuration





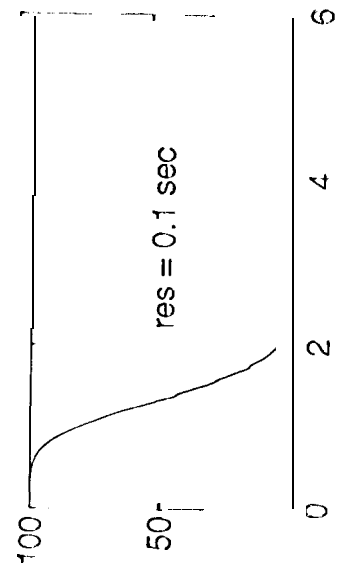
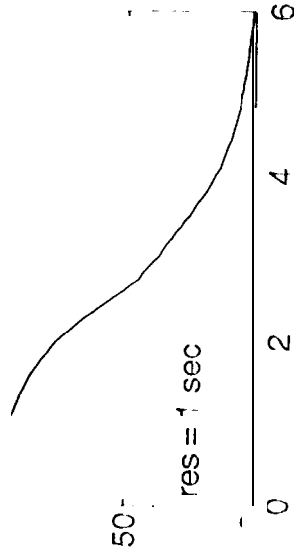
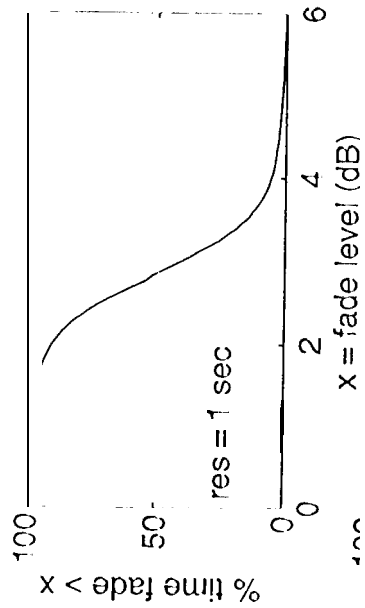
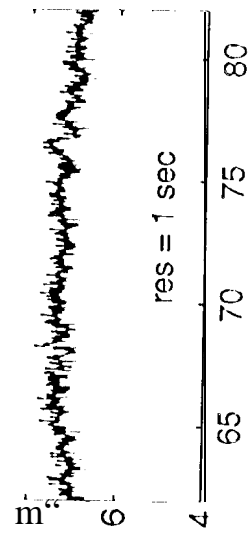
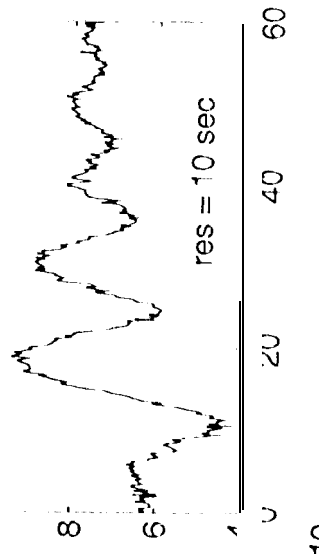
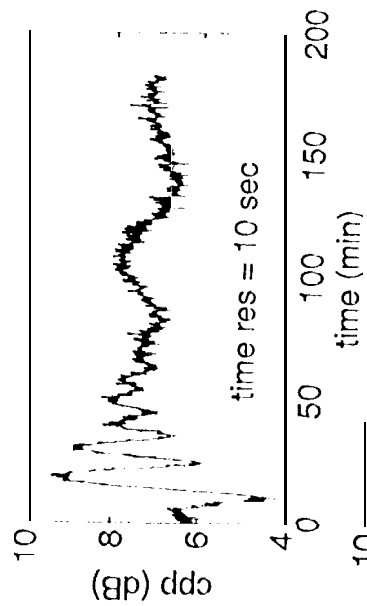
Antenna Tracking Performance (KAO Flight 8-25-95)



Time (seconds) at about UTC 1995 Aug 26, 09:14

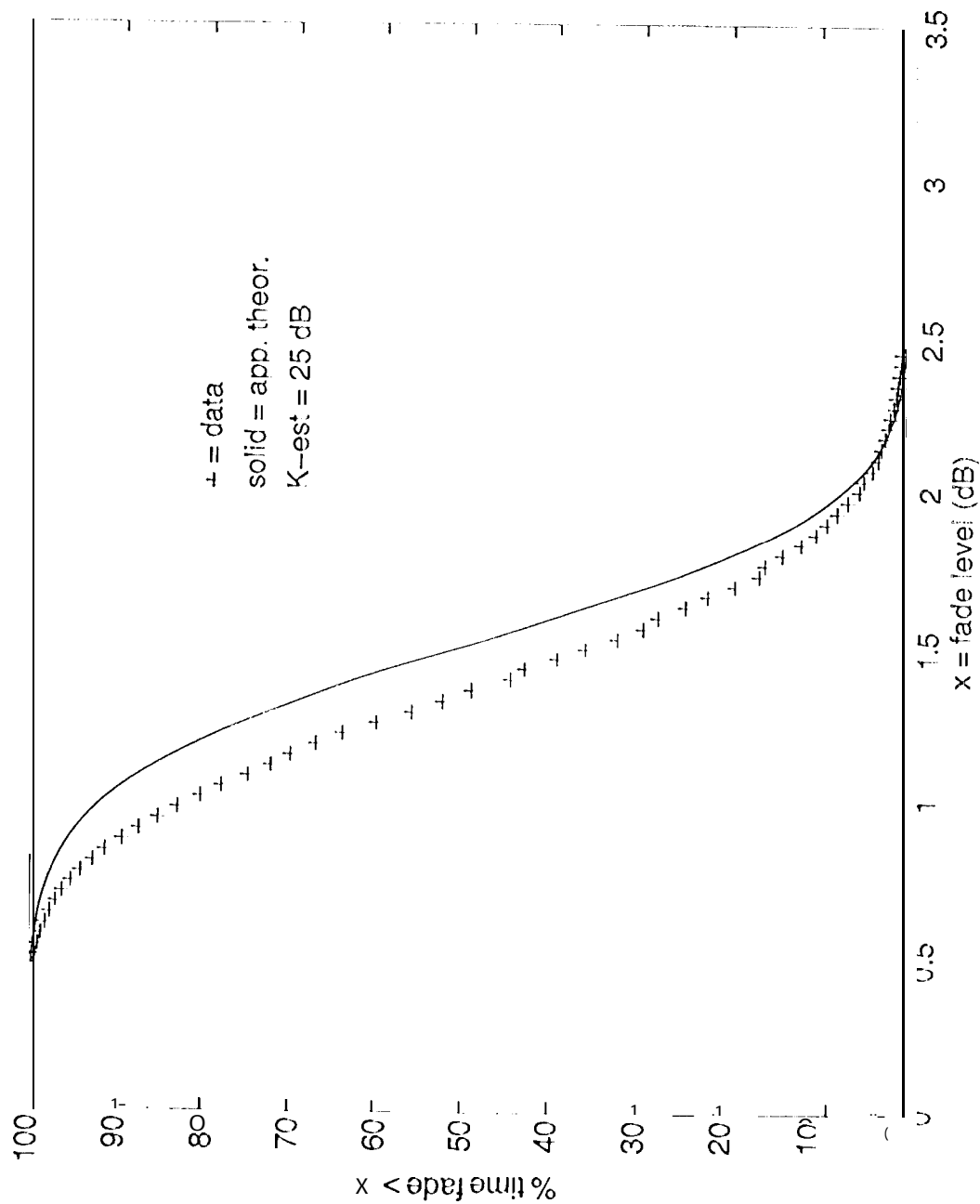


Coherent Pilot Power and Cumulative Fade Distributions
for 12 October 1995 starting at 15:08:00





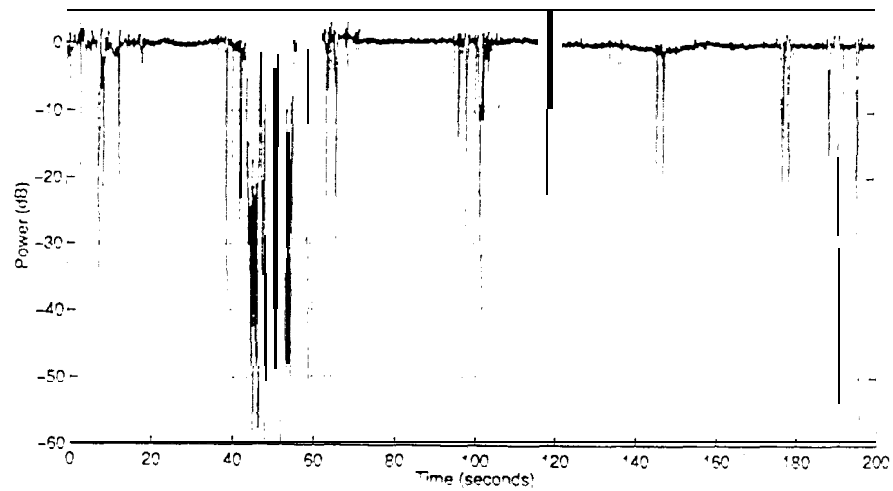
Approximate Fit Between Coherent Pilot Power Cumulative Fade Distribution and LOS Model
for 12 October 1995 between 16:10:00 and 16:30:00 (0.1 sec sampling)



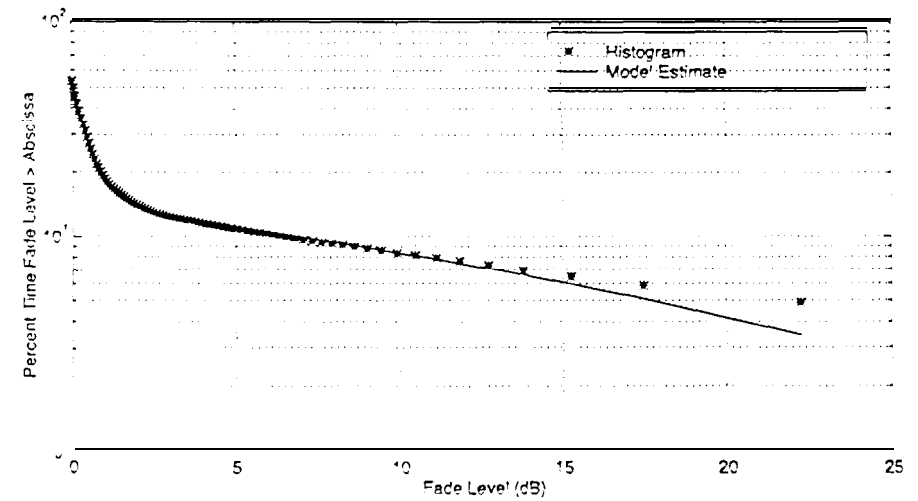


Coherent Pilot Power and Cumulative Fade Distribution for a typical
K-Band Land Mobile Satellite Channel (Humpherys & Rice, 1996)

Time Series

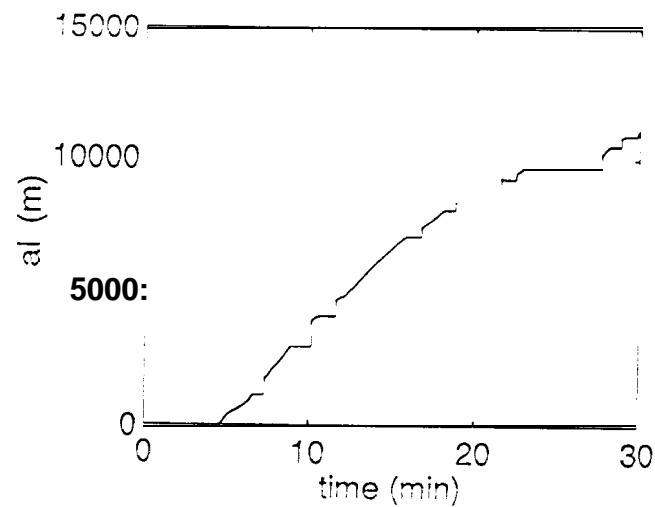
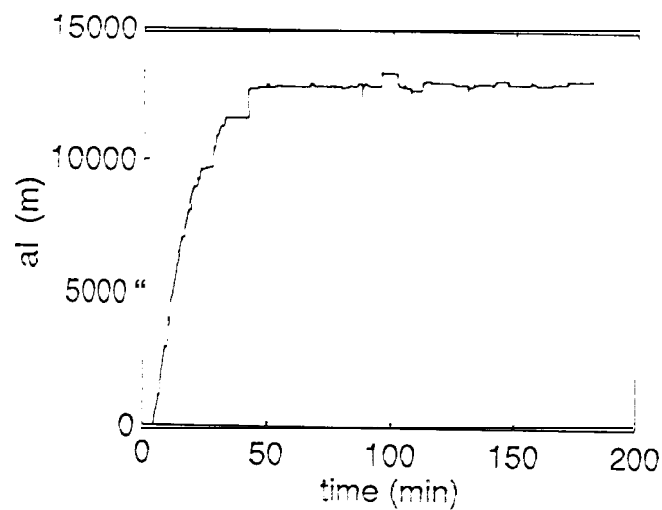
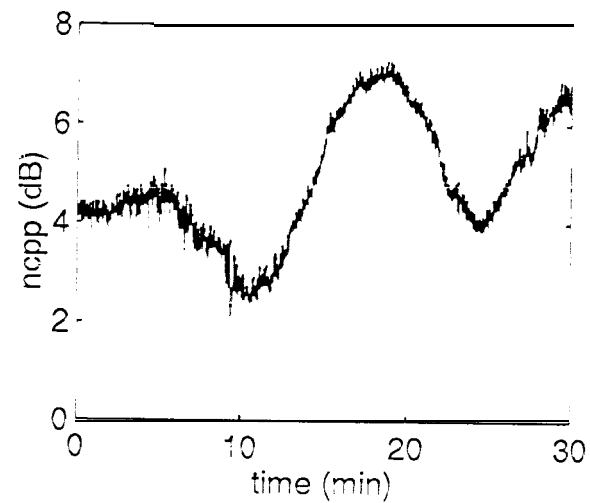
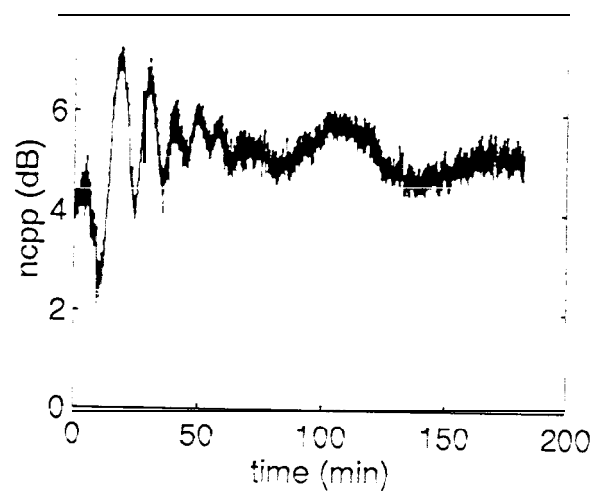


Cumulative Fade Distribution



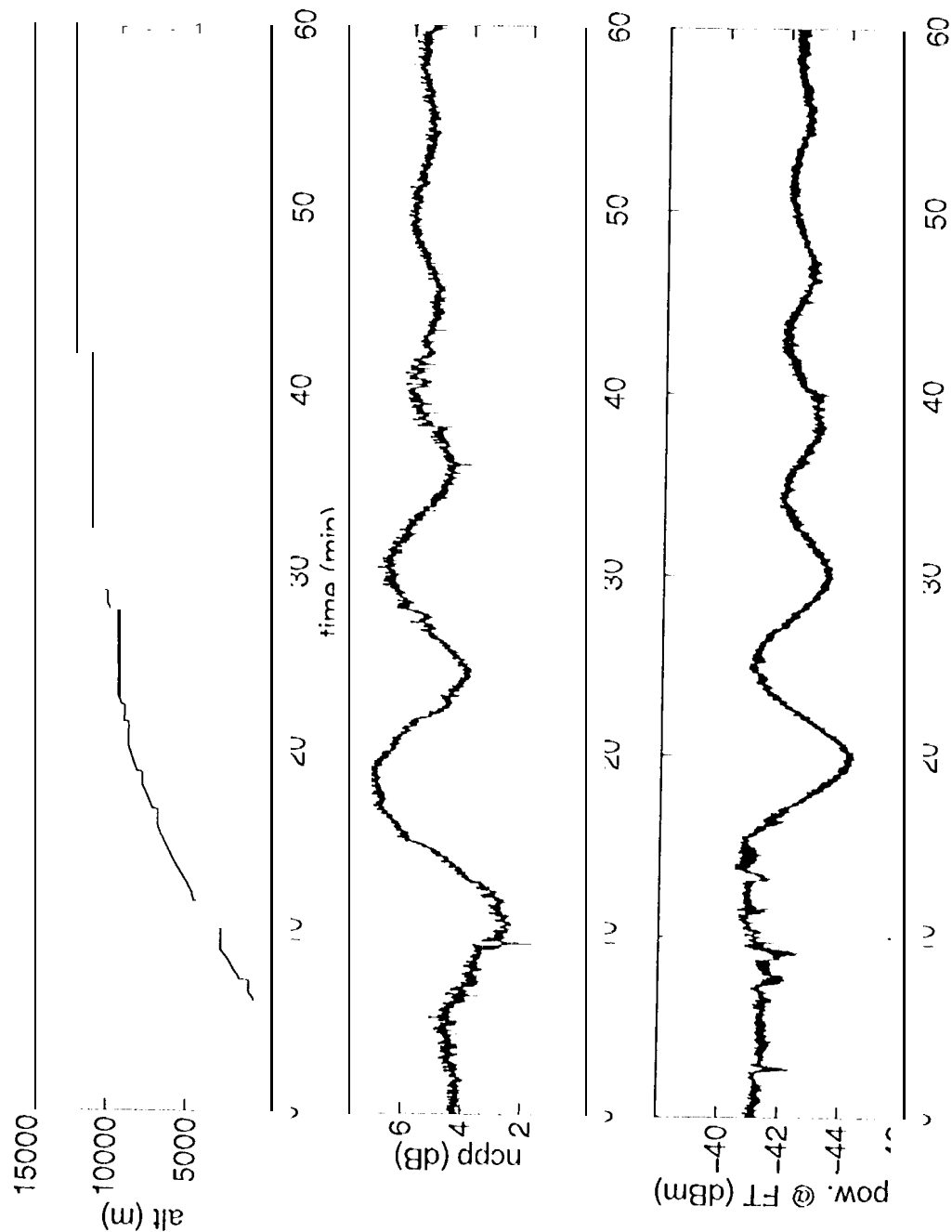


Noncoherent Pilot Power and Altitude for 12 October 1995 starting at 15:08:00



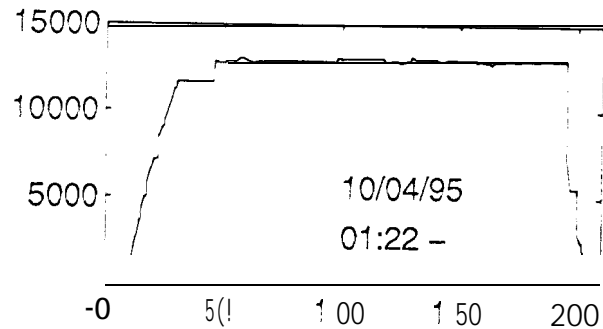
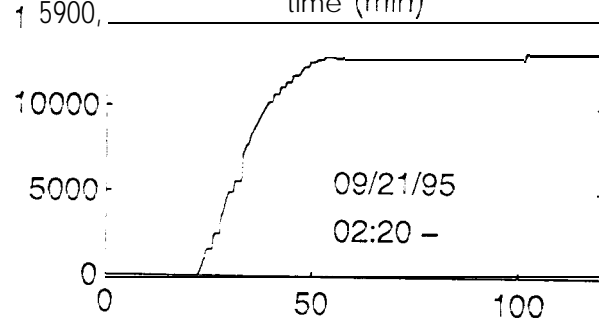
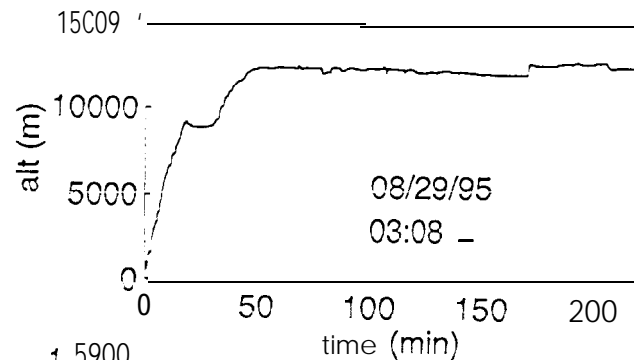
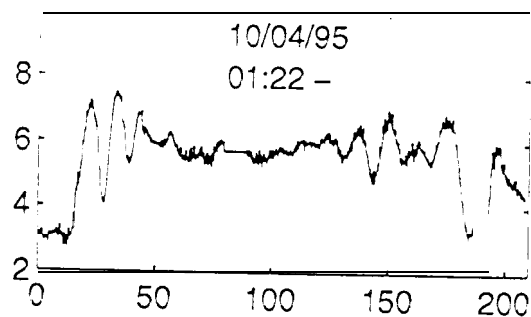
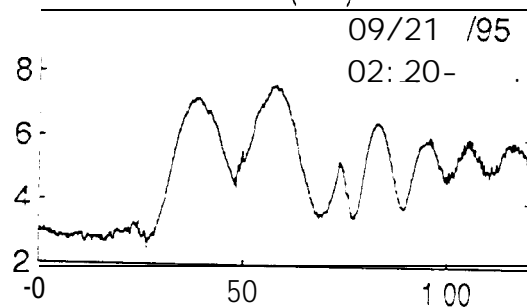
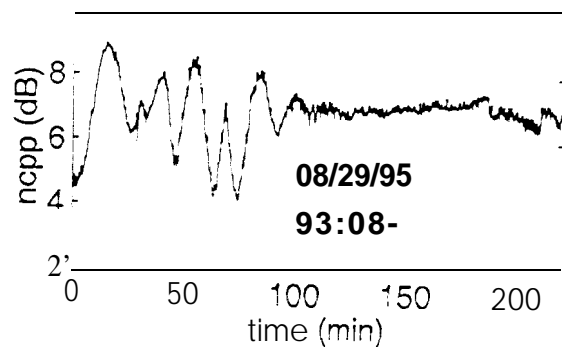


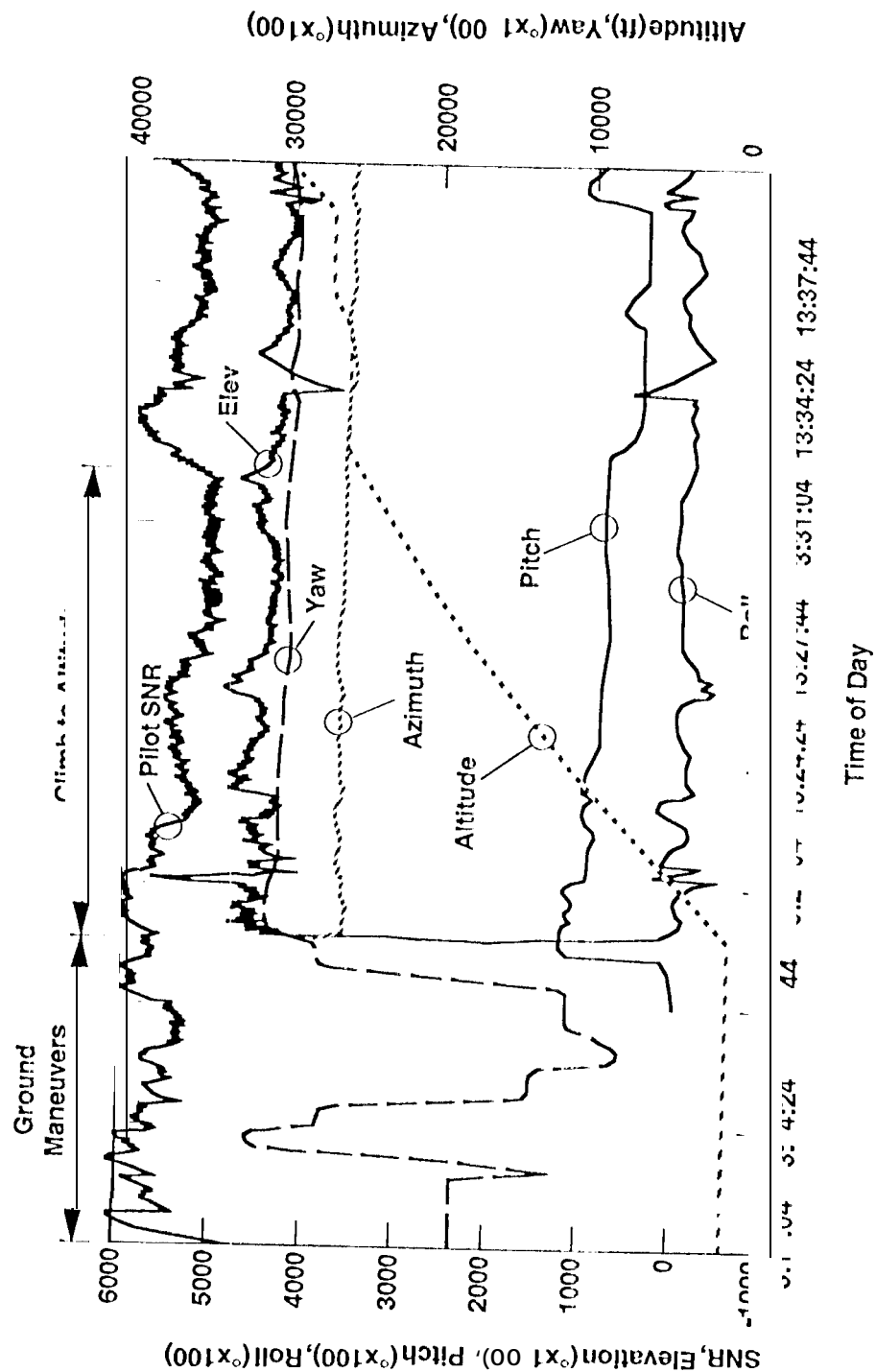
Altitude, Noncoherent Pilot Power and Received Power in the Data Channel at the FT
for 12 October 1995 starting at 15:08:00





Noncoherent Pilot Power and Altitude for Various Days







Preliminary Conclusions

.Received pilot power data characterized by slowly varying amplitude ($< \pm 2.5$ dB) during aircraft ascent/descent:

- Antenna tracking does not “appear” to be the cause, but **final** determination **can only** be made after antenna **pointing error data** are extracted
- Temperature-induced changes in Rx/Tx gain is a possibility
- Atmospheric attenuation **is not likely since a lot** of the flights were conducted under **clear sky** conditions
- Shadowing/scattering from the **tail** structure **may** contribute
- ACTS **steerable** beam (SB) pointing does not **appear** to be the cause, e.g., on 10/12/95 the SB **was** **initially** pointed to **Moffett Field** and was incrementally moved about **6** steps every five minutes **in** an easterly direction in response to the GPS inputs -- **similarly** for the other days
- Comparable variability in received **pilot** power is not observed on ascent in the Rockwell **Saberliner** data set - but aircraft is much **smaller**

.Received power in the data channel at the fixed ground terminal reveals similar variability

- Changes in received power at the ground **terminal** during ascent are not synchronous **with** the changes in received **pilot** power at the aircraft but are of the same magnitude (**lack of synchronicity possibly** caused in part by the difference in propagation frequencies)
- This variability in received power at the ground station is consistent with either temperature variations in **Rx/Tx gain** at the aircraft or propagation-related phenomena

.Over < 10 min time scales and at level altitude, pilot propagation can be characterized by LOS propagation with large Rician parameter (> 25 dB)

.Work is on-going to better understand this airborne propagation channel